

Discussion of Pulse Volume & Duration Recommendations for Instream Environmental Flow Standard Recommendations

Nueces BBASC Meeting

June 20, 2012

Pulse Volume & Duration Bound vs. Regressed Values

- 1) Recommendations of the BBEST not yet discussed or evaluated by the full BBASC.
- 2) Discussed by the BBASC Workgroup on 6/6/2012 resulting in a Workgroup recommendation and a request to investigate yield impacts.
- 3) BBASC to affirm or refine Workgroup recommendation today.

Nueces River @ Cotulla

BBEST Flow Recommendation

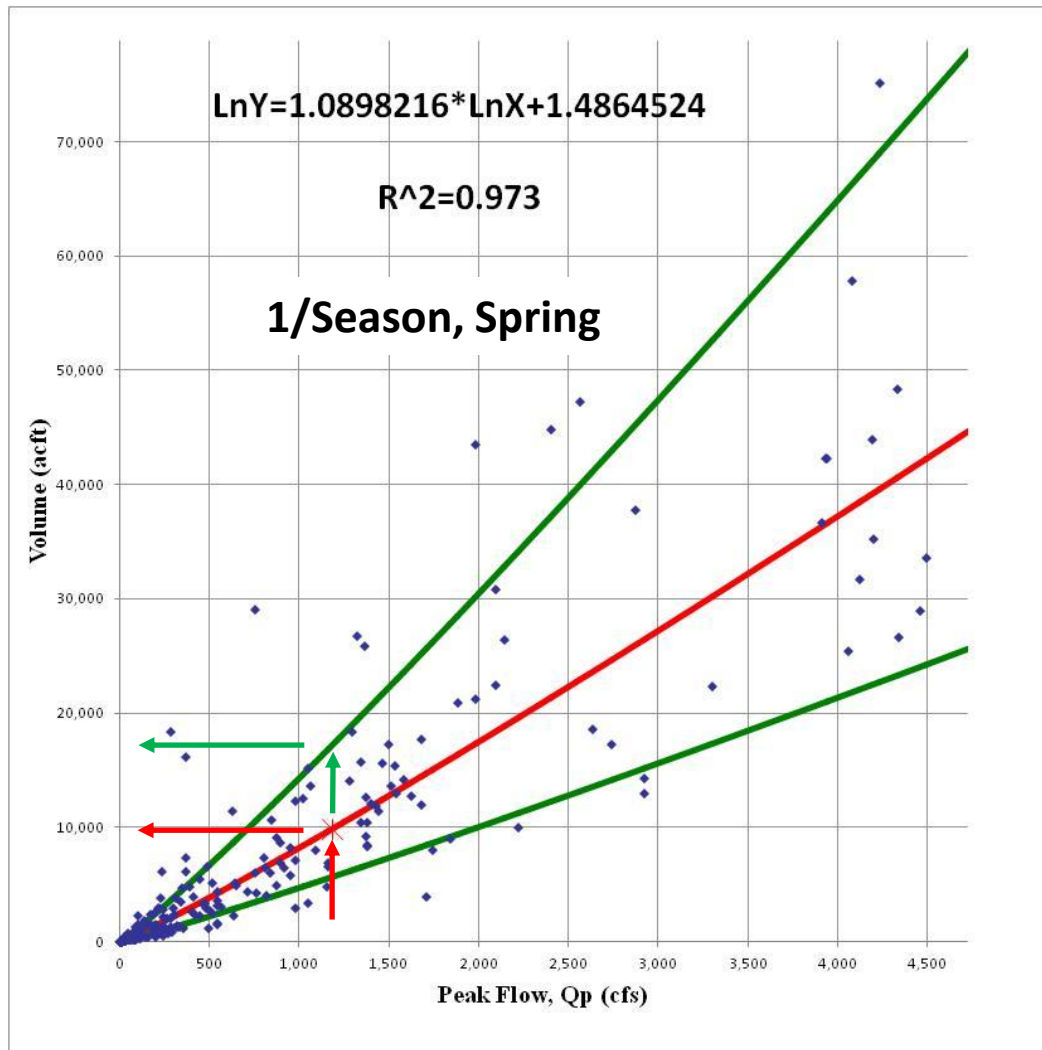
Overbank Events	Qp: 15,100 cfs with Average Frequency 1 per 5 years Regressed Volume is 151,000 Duration Bound is 42												
	Qp: 8,410 cfs with Average Frequency 1 per 2 years Regressed Volume is 80,700 Duration Bound is 38												
	↑ “Regressed”	Qp: 4,460 cfs with Average Frequency 1 per year Regressed Volume is 41,100 Duration Bound is 34											
		↓ “Bound”	Qp: 1,560 cfs with Average Frequency 2 per year Volume Bound is 24,200 Duration Bound is 28										
High Flow Pulses	Qp: 96 cfs with Average Frequency 1 per season Volume Bound is 1,570 Duration Bound is 20				Qp: 1,180 cfs with Average Frequency 1 per season Volume Bound is 17,200 Duration Bound is 24				Qp: 100 cfs with Average Frequency 1 per season Volume Bound is 1,030 Duration Bound is 16		Qp: 640 cfs with Average Frequency 1 per season Volume Bound is 8,610 Duration Bound is 26		
	Qp: 8 cfs with Average Frequency 2 per season Volume Bound is 100 Duration Bound is 13				Qp: 190 cfs with Average Frequency 2 per season Volume Bound is 2,370 Duration Bound is 17						Qp: 35 cfs with Average Frequency 2 per season Volume Bound is 360 Duration Bound is 14		
					Qp: 15 cfs with Average Frequency 3 per season Volume Bound is 150 Duration Bound is 11								
Base Flows (cfs)	38				31				42				
	6				10				7		15		
Subsistence Flows (cfs)	1												
	1												
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	
	Winter					Spring			Summer		Fall		

Flow Levels	High (75th %ile)
	Medium (50th %ile)
	Low (25th %ile)
	Subsistence

Pulse volumes are in units of acre-feet and durations are in days.
Period of Record used : 1/1/1927 to 12/31/2009.

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Pulse Volume Regression & Bounds



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Bound Pulse Volumes & Durations

Peak Flow (cfs)						
Events	Average Frequency	Annual	Winter	Spring	Summer	Fall
Overbank Events	1 per year	4460				
High Flow Pulses	Tier1	2 per year	1560			
	Tier2	1 per season	96	1180	103	644
	Tier3	2 per season	7.6	192		35
	Tier4	3 per season	0.7	15		
	Tier5	4 per season	0.09			

Upper Prediction Interval Volume (ac-ft)						
Events	Average Frequency	Annual	Winter	Spring	Summer	Fall
Overbank Events	1 per year	73993				
High Flow Pulses	Tier1	2 per year	24155			
	Tier2	1 per season	1572	17154	1027	8609
	Tier3	2 per season	104	2370		358
	Tier4	3 per season	8	147		
	Tier5	4 per season	1			

Upper Prediction Interval Duration (days)						
Events	Average Frequency	Annual	Winter	Spring	Summer	Fall
Overbank Events	1 per year	34				
High Flow Pulses	Tier1	2 per year	28			
	Tier2	1 per season	20	24	16	26
	Tier3	2 per season	13	17		14
	Tier4	3 per season	9	11		
	Tier5	4 per season	6			

Approximately 84% of pulses of specified peak and frequency have associated volume and duration less than the upper "Bound" values.

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Regressed Pulse Volumes & Durations

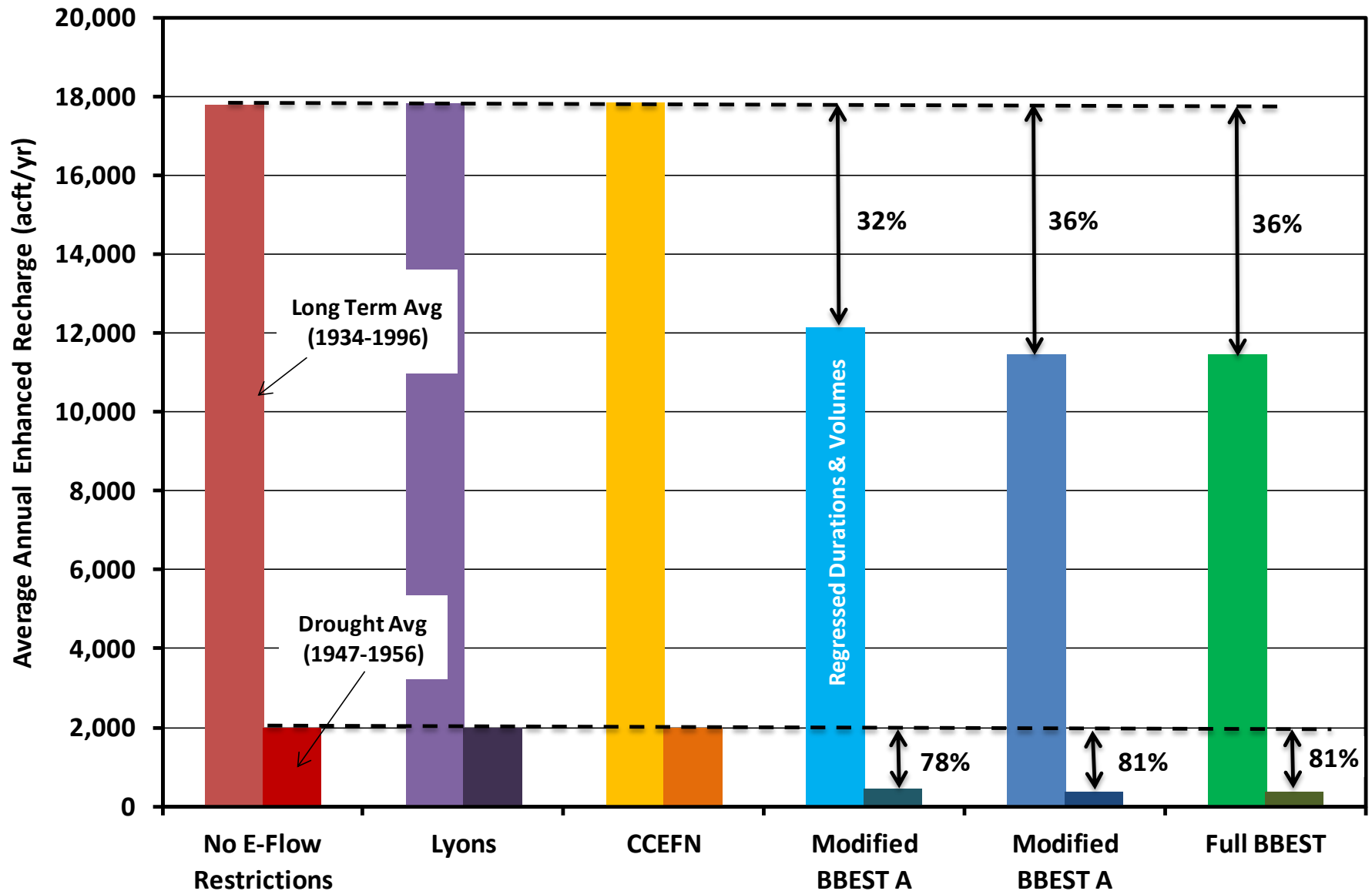
Peak Flow (cfs)						
Events	Average Frequency	Annual	Winter	Spring	Summer	Fall
Overbank Events	1 per year	4460				
High Flow Pulses	Tier1	2 per year	1560			
	Tier2	1 per season		96	1180	103
	Tier3	2 per season		7.6	192	35
	Tier4	3 per season		0.7	15	
	Tier5	4 per season		0.09		

Volume (ac-ft)						
Events	Average Frequency	Annual	Winter	Spring	Summer	Fall
Overbank Events	1 per year	41055				
High Flow Pulses	Tier1	2 per year	13405			
	Tier2	1 per season		830	9848	622
	Tier3	2 per season		55	1361	210
	Tier4	3 per season		4	85	
	Tier5	4 per season		0		

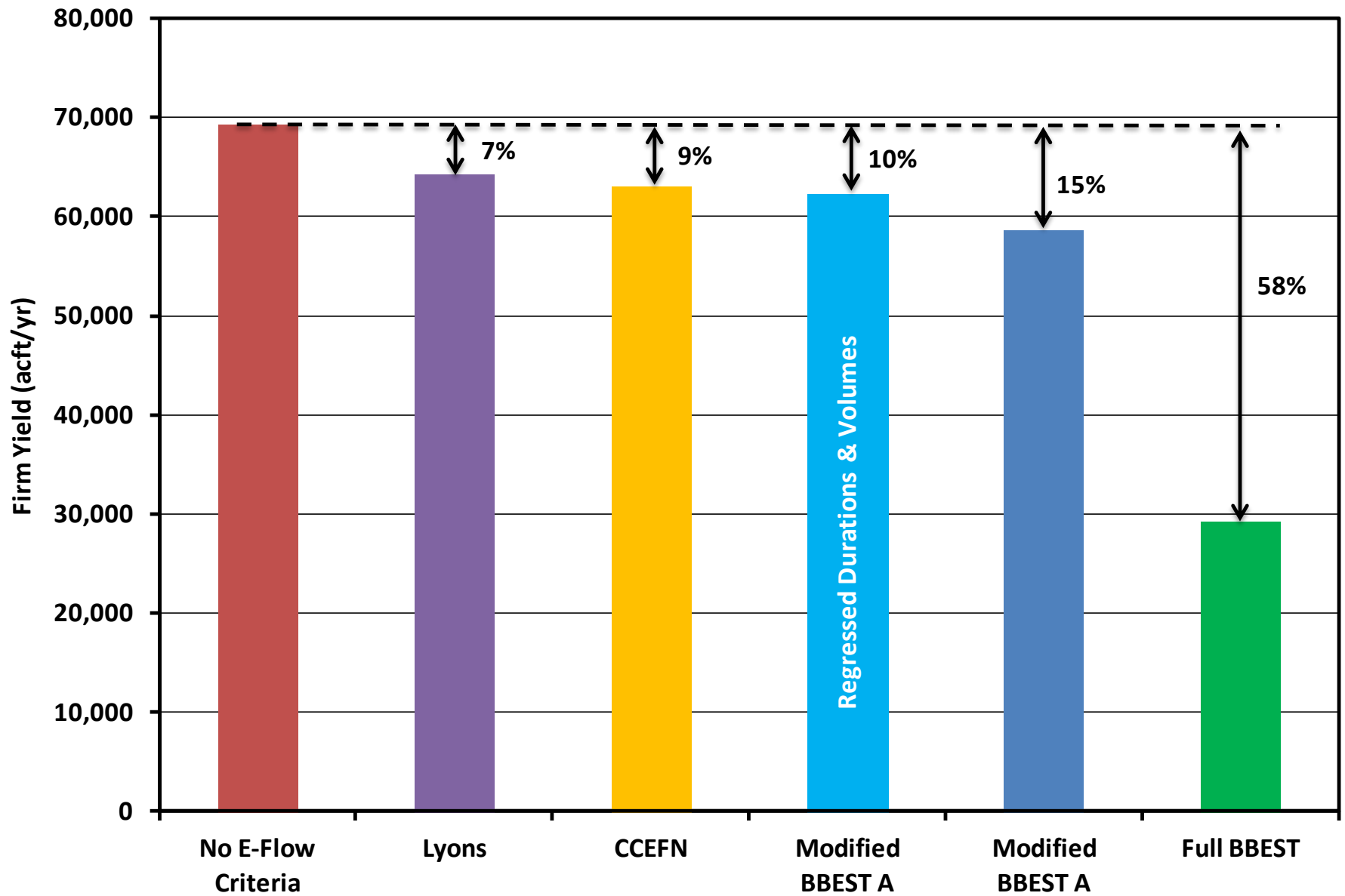
Duration (days)						
Events	Average Frequency	Annual	Winter	Spring	Summer	Fall
Overbank Events	1 per year	17				
High Flow Pulses	Tier1	2 per year	14			
	Tier2	1 per season		10	13	8
	Tier3	2 per season		6	9	7
	Tier4	3 per season		4	6	
	Tier5	4 per season		3		

Approximately 50% of pulses of specified peak and frequency have associated volume and duration less than the "Regressed" values.

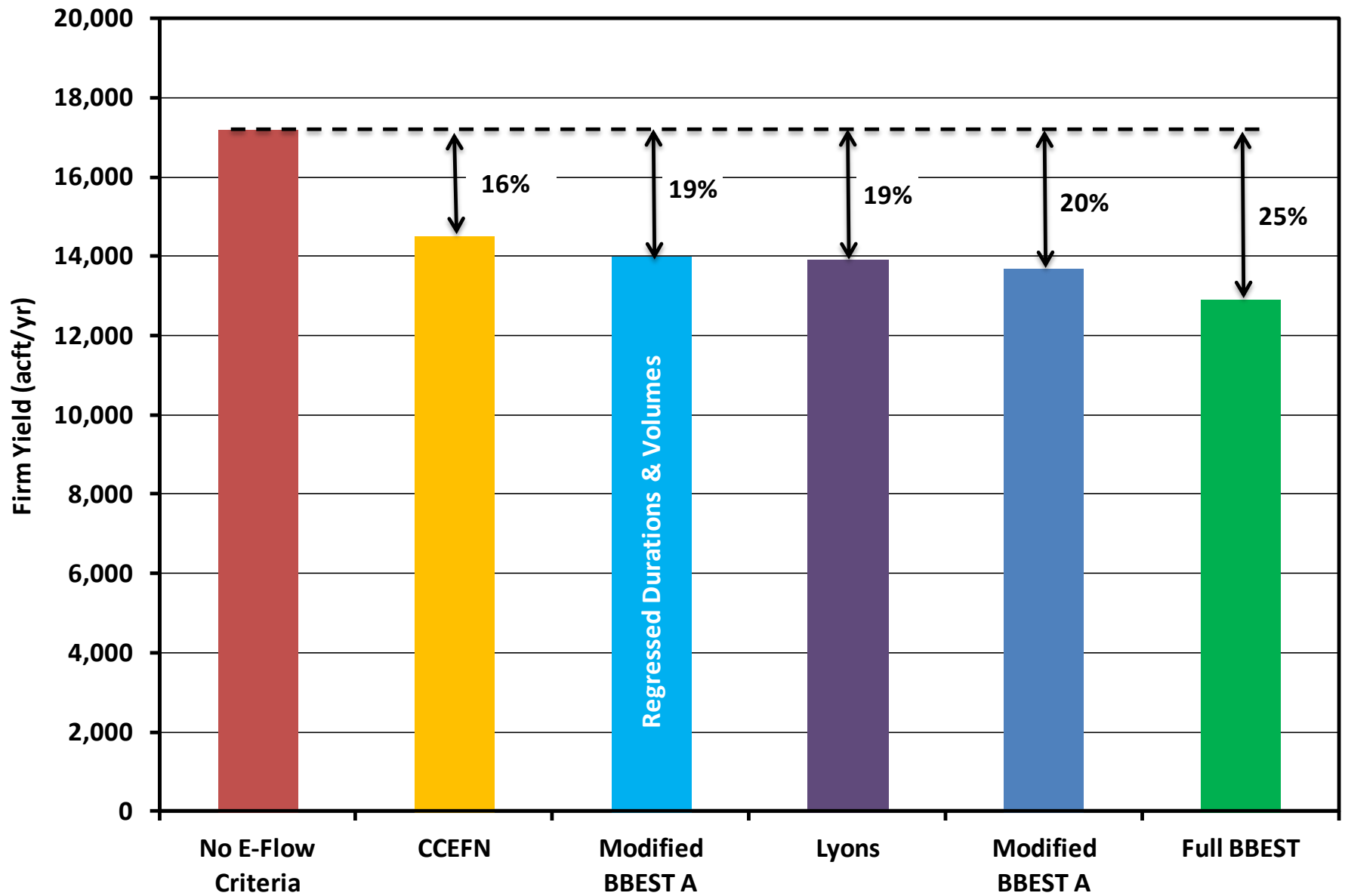
Sabinal Recharge Reservoir - Average Annual Enhanced Recharge



Cotulla Reservoir - Firm Yield Summary



Cotulla Off-Channel Reservoir - Firm Yield Summary



Observations

- 1) Use of high flow pulse volume and duration “Bound” values seeks to force substantially greater pulse duration and volume passage than have typically occurred historically.
 - a) Reduces firm yield of potential projects.
 - b) Increases environmental protection.
- 2) Use of “Regressed” high flow pulse volume and duration values is consistent with historical streamflow events.
 - a) Increases firm yield of potential projects.
 - b) Reduces environmental protection.

Nueces BBASC Workgroup Recommendation

- 1) Retain (do not modify) Nueces BBASC instream flow recommendations, including upper bounds on some pulse volumes and durations, as recommended by the BBEST and agreed upon by consensus during the 5/23/2012 meeting.
- 2) Include further investigations of the ecological and water supply ramifications of this recommendation in the work plan.

Nueces BBASC Recommendation